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HO, CHUONG T

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/552,601	<b>Applicant(s)</b> CHIN ET AL.	
	<b>Examiner</b> CHUONG T. HO	<b>Art Unit</b> 2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 18-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 18-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/09/09 has been entered.
2. The amendment filed 03/09/09 have been entered and made of record.
3. Claims 1-8, 9-13, 18-24 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1, 4, 7-8, 18, 21, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (Patent No: 6,021,132) in view of Sindhu et al. (Patent No.: 6,493,347).

Regarding to claim 1, Muller '132 disclose a method for storing (figure 3A, col. 8, lines 37-39, stored therein packets) in a shared memory (col. 8, lines 37-39, shared memory) in a packet switch (figure 2, switching fabric), said shared memory comprising two or more buffers (figure 3A, shared memory comprises buffer #1, buffer #2, buffer #3), said method comprising the step of:

- ◆ Storing at least a portion of a packet in contiguous banks of a first buffer (see figure 3A, banks = buffer #1, buffer #2, buffer #3) (col. 8, lines 37-42, Referring now to FIG. 3A, a logical view of shared memory 230 is depicted having stored therein packet data in a number of buffers. In this example, the shared memory 230 is segmented into a number of buffers (pages) of programmable size. All the buffers may have the same size, or alternatively, individual buffer sizes may vary) (col. 7, lines 7, a portion of the received packets may be buffered temporary) in contiguous banks (see figure 3A, banks = buffer #1, buffer #2, buffer #3) of a first buffer (figure 3A, shared memory 230).

Muller '132 disclose all the subject matter of the claim invention above with the exception of disclosing each of said one or more buffers comprising a plurality of banks.

Sindhu '347, the same or similar fields of endeavor, disclose one buffer (figure 2B, figure 9, col.3, lines 39-40, the data buffer 104 includes two or more memory banks,

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the data packet is divided among the memory banks); Storing at least a portion of a packet in contiguous banks of a first buffer (col. 2, lines 40-45, storing portions of a data packet in each memory banks of the data buffer 104).

Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to use the data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks as taught by Sindhu'347 in the shared memory of Muller '132. The data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks can be implemented / modified the shared memory of Muller '132 by using the shared memory (figure 3A) to perform. The motivation for using the data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks as taught by Sindhu'347 into the shared memory of Muller '132 being that it allows the memory to be read and written conveniently (Sindhya, col. 4, line 9).

Regarding to claim 4, Muller et al. discloses wherein at least a portion (col. 7, line 7, portions of packet #1) (portions of packet #2) of each of two or more packets are stored in one of said buffers (figure 3A, 350, buffer #1 stored portions of packet #1) (figure 3A, 360, buffer #1 stored portion of packet #2) (figure 3A, 351, buffer #2 stored portions of packet #1) (figure 3A, 361, buffer #2 stored portions of packet #2).

Regarding to claim 7, Muller et al. discloses wherein said shared memory exchanges packets between ports (between input ports and output ports) in said packet switch (col.

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7, lines 12-15, After a forwarding decision is received for a particular packet, the input port 206 transfers ownership of the one or more buffers corresponding to the packet to the appropriate output port(s) 206. The transfer of ownership includes the input port 206 notifying the shared memory manager 220 of the number of output ports 206 that should transmit the packet and the input port 206 forwarding the appropriate pointers to those output ports 206).

Regarding to claim 8, Muller '132 packets are stored in contiguous banks (col. 8, lines 43-44, buffers comprise number of memory lines) of at least one of said two or more buffers (figure 3A, buffer #1, buffer #2, buffer #3); however, Muller et al. are silent to disclosing wherein said sequential data units of said packet are stored in contiguous banks of at least one of said one or more buffers.

Sindhu '347 disclose wherein said sequential data units of said packet are stored in at least one of said one or more buffers (col. 22, lines 33-34, Let the cells generated by a given stream be numbered  $I, I + 1, I + 2, \dots$  etc. As was described above, cells are written to sequentially increasing bank number  $I \bmod b$ ) (Abstract, the distributed memory includes two or more memory banks, Each memory bank is used for storing uniform portions of a data packet received from source and linking information of a data packet to allow for the extraction of the uniform portions of a data packet from distributed location in memory in proper order).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein said sequential data units of said packet are stored

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in at least one of said one or more buffers taught by Sindhu '347 into the system of Muller '132 in order to allow the memory to be read and written conveniently (Sindhy, col. 4, line 9).

Regarding to claim 18, Muller '132 disclose a shared memory for storing a packet (col. 8, lines 38-39, shared memory 230 is depicted having stored therein packet data in a number of buffers), comprising:

- ♦ Two or more buffer,(see figure 3A, shared memory includes buffer #1, buffer #2, buffer #3) (col. 8, lines 37-42, Referring now to FIG. 3A, a logical view of shared memory 230 is depicted having stored therein packet data in a number of buffers. In this example, the shared memory 230 is segmented into a number of buffers (pages) of programmable size. All the buffers may have the same size, or alternatively, individual buffer sizes may vary) (col. 7, lines 7, a portion of the received packets may be buffered temporary) in contiguous banks (see figure 3A, banks = buffer #1, buffer #2, buffer #3) of a first buffer (figure 3A, shared memory 230).

However, Muller '132 are silent to disclosing each of said buffers comprising a plurality of banks, wherein at least a portion of said packet is stored in contiguous banks of a first bufferr of said two or more buffers.

Sindhu '347, as the same or similar fields of endeavor, disclose each (col. 3, lines 35-45, the global data buffer 104) of said buffers comprising a plurality of banks

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(two or more memory banks) , wherein at least a portion of said packet is stored in contiguous banks of a first buffer (col. 2, lines 25-45, each memory banks of the global data buffer stores portions of the data packet) of said two or more buffers.

Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to use the data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks as taught by Sindhu'347 in the shared memory of Muller '132. The data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks can be implemented / modified the shared memory of Muller '132 by using the shared memory (figure 3A) to perform. The motivation for using the data buffer 104 includes two or more memory banks, the data packet is divided among the memory banks as taught by Sindhu'347 into the shared memory of Muller '132 being that it allows the memory to be read and written conveniently (Sindhya, col. 4, line 9).

Regarding to claim 21, claim 21 is rejected the same reasons of claim 4 above.

Regarding to claim 23, claim 23 is rejected the same reasons of claim 7 above.



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5. Claims 2, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 – Sindhu '347) in view of Benson et al. (Patent No.: 6,151,321).

Regarding to claim 2, the combined system (Muller '132 – Sindhu '347) disclose wherein said packet (packet #1) comprises a plurality of portions (portions of packet #1) , and further comprising the step of storing an portion of said packet in contiguous banks of buffer (figure 3A, shared memory 230).

However, the combined system (Muller '132 – Sindhu '347) are silent to disclosing said data unit stored in said last bank of said first buffer is not a last data unit of said packet.

Benson '321, as the same or similar fields of endeavor, discloses the received shared memory pool mechanism 120 includes a first received shared memory pool 136 and second received shared memory pool 138. Each receive shared memory pool has receive local buffers 122 (see col. 5, lines 40-42) (col. 5, line 48-49, two or more pools allows for the advantage of multiple bank typically built into memory device); comprising:

The step of storing an additional portion (the rest of the cell of the packet) of said packet in a second buffer (the second card buffer) if one of said portions (the cell of the packet) is stored in said first buffer (the first card buffer) and said portions stored in said first buffer (the first card buffer) is not a last portion of said packet (figure 7B, place enough data in the first card buffer to fill the host buffer, place the rest of the cell into the second card buffer).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate storing an additional portion of said packet in a second buffer if one of said data units is stored in said first buffer and said data unit stored in said first buffer is not a last unit of said packet taught by Benson '321 into the combined system (Muller '132 – Sindhu '347) in order to desire to utilize a dynamic packet memory management scheme to facilitate sharing of a common packet memory among all input / output ports for packet buffering (see Muller et al. col. 2, lines 16-17).

Regarding to claim 19, claim 19 is rejected the same reasons of claim 2 above.

6. Claims 3, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 – Sindhu '347) in view of Kamaraj et al. (Patent No.: 6,501,757)

Regarding to claim 3, the combined system (Muller '132 – Sindhu '347) disclose one or more buffer in shared memory; two or more buffer comprising a plurality of banks (col. 8, line 43, the buffers may be further subdivided into a number of memory lines); however, Muller '132 are silent to disclosing wherein each of said one or more buffers comprises one or more group and each of said groups comprises a plurality of banks.

Kamaraj '757 disclose wherein each of said two or more buffers comprises one or more group and each of said groups comprises a bank (col. 7, lines 41-42, said cell buffer being housed in a shared cell buffer pool "buffer" organized as a bank of a plurality of groups.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein each of said one or more buffers comprises one or more group and each of said groups comprises a bank taught by Kamarau '757 into the combined system (Muller '132 – Sindhu '347) in order to provide efficient implementation of internal queue while also allowing configurability of speeds (Kamaraj, col. 6, lines 52-53).

Regarding to claim 20, claim 20 is rejected the same reasons of claim 3 above.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 – Sindhu '347) in view of Beshai (Pub. No.: 2004/0184448).

Regarding to claim 5, Muller '132 disclose each of said data port corresponding to one or more of said plurality of banks "buffers" (col. 8, lines 43-44, the buffers may be subdivided into a number of memory lines "banks") (col. 15, lines 1-2, a shared pool of packet memory and provides for efficient allocating of per port buffering that is proportional to the amount of traffic through a given port) ; however, Muller et al. are silent to disclosing the step of cyclically accessing one or more data ports.

Beshai '448 discloses the step of cyclically accessing one or more data ports (page 1 paragraph [0005] the output rotor cyclically connects each transmit memory to each output port "data ports").

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Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the step of cyclically accessing one or more data ports taught by Beshai '448 into the combined system (Muller '132 – Sindhu '347) in order to desire to utilize dynamic packet memory management scheme to facilitate sharing of a common packet memory among all input / output ports for packet buffering (Muller, col. 2, lines 16-18).

8. Claims 6, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 – Sindhu '347) in view of Lavelle et al. (Patent No.: US 6,812,929).

Regarding to claim 6, Muller '132 disclose allocating buffer in response to a buffer request (col. 10, lines 50-53, FIG. 5 is a flow diagram illustrating buffer allocation processing according to one embodiment of the present invention. At step 505, the next free buffer pointer is produced by the pointer generator 440. In one embodiment, the pointer generator 440 attempts to keep one or more pointers available to allow immediate servicing of buffer requests).

However, Muller '132 are silent to disclosing wherein said banks are divided into a first set of banks and a second set of banks, and a buffer that comprises one or more banks from said first set and a buffer that comprises one or more banks from said second set.

Lavelle '929 disclose wherein said banks are divided into a first set of banks and a second set of banks, and a buffer that comprises one or more banks from said first set

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and a buffer that comprises one or more banks from said second set (col. 14, lines 59-62, a frame buffer, wherein the frame buffer includes a first set of one or more banks, a second set of one or more memory banks).

Thus, one would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein said banks are divided into a first set of banks and a second set of banks, and a buffer that comprises one or more banks from said first set and a buffer that comprises one or more banks from said second set taught by Lavelle '929 into the combined system (Muller '132 – Sindhu '347) in order to improve the efficiency of accesses to the frame buffer so that rendering accesses may be performed more quickly (Lavelle, col. 2, lines 53-54).

Regarding to claim 22, claim 22 is rejected the same reasons of claim 6 above.

9. Claim 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 – Sindhu '347) in view Manning et al. (Patent Number: 6,088,736).

Regarding to claim 24, Muller '132 disclose a method for managing a share memory (figure 2, figure 3, shared memory 230, col. 8, lines 37-38, the shared memory 230 is depicted having stored therein packet data in a number of buffers), said shared memory comprising one or more buffers (figure 3A, buffer #1, buffer #2, buffer #3), said method comprising the step of:

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Maintaining a buffer usage count (see abstract, buffer usage count) for at least one of said buffers (Abstract, a shared memory manager for a packet forwarding device includes a pointer memory having stored therein information regarding buffer usage (e.g., usage counts) for each of a number of buffers in a shared memory ) (col. 7, lines 25-27, The shared memory manager 220 then updates its internal counts used for tracking the number of buffer owners and returns the buffer to the free pool if appropriate (e.g., the buffer is no longer in any output queues)) (col. 9, lines 35-37, The buffer tracking unit 329 additionally includes a pointer random access memory (PRAM) 320. The PRAM 320 may be an on or off-chip pointer table that stores usage counts for buffers of the shared memory 230);

a counter for monitoring a buffer usage count (Abstract, Usage count) provides an indication of the input (write) over all packets in said at least one of said buffers of the number of output ports (two output ports) toward which each of said packet is destined (col. 12, lines 30-31, the other two output ports 206 complete transmission of the buffer and so notify the buffer tracking unit 329 Write "SUM" = 0010b) (col. 12, lines 27-30, The buffer tracking unit 329 processes the input port's 0010b notification which indicates there are 3 buffer owners. Read: 1110b Modify: 1110b + 0011b + 0001b = 0010b Write: 0010b The other two output ports 206 complete transmission of 0010b the buffer and so notify the buffer tracking unit 329);

wherein said at least one of said buffers contains two or more packets (see abstract, buffers for temporary buffering the packets).

However, Muller '132 are silent to disclosing a sum over all packet in said at least one of said buffer.

Manning '736, as the same or similar fields of endeavor, disclose buffer usage count (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)) (col. 13, lines 40-45, buffer usage data); comprising:

buffer provides an indication of the sum (col. 6, lines 20-35, total number of cells) over all packets in said at least one of said buffers of the number of output ports toward which each of said packets is destined, wherein said at least one of said buffers contains two or more packets (col. 6, lines 25-35, Buffer\_counter 32 means sum of number of packets in the buffer) (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teaching of Manning '736 into the combined system (Muller '132 – Sindhu '347), since Manning '736 recited the motivation in the col. 1, lines 10-12, which is a joint flow control mechanism in a distributed switching architecture.

10. Claims 9, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (Patent Number: 6,021,132) in view of Manning et al. (Patent Number: 6,088,736).

Regarding to claim 9, Muller '132 disclose a method for managing a share memory (figure 2, figure 3, shared memory 230, col. 8, lines 37-38, the shared memory 230 is

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depicted having stored therein packet data in a number of buffers), said shared memory comprising one or more buffers (figure 3A, buffer #1, buffer #2, buffer #3), said method comprising the step of:

Maintaining a buffer usage count (see abstract, buffer usage count) for at least one of said buffers (Abstract, a shared memory manager for a packet forwarding device includes a pointer memory having stored therein information regarding buffer usage (e.g., usage counts) for each of a number of buffers in a shared memory ) (col. 7, lines 25-27, The shared memory manager 220 then updates its internal counts used for tracking the number of buffer owners and returns the buffer to the free pool if appropriate (e.g., the buffer is no longer in any output queues)) (col. 9, lines 35-37, The buffer tracking unit 329 additionally includes a pointer random access memory (PRAM) 320. The PRAM 320 may be an on or off-chip pointer table that stores usage counts for buffers of the shared memory 230);

a counter for monitoring a buffer usage count (Abstract, Usage count) provides an indication of the input (write) over all packets in said at least one of said buffers of the number of output ports (two output ports) toward which each of said packet is destined (col. 12, lines 30-31, the other two output ports 206 complete transmission of the buffer and so notify the buffer tracking unit 329 Write "SUM" = 0010b) (col. 12, lines 27-30, The buffer tracking unit 329 processes the input port's 0010b notification which indicates there are 3 buffer owners. Read: 1110b Modify: 1110b + 0011b + 0001b = 0010b Write: 0010b The other two output ports 206 complete transmission of 0010b the buffer and so notify the buffer tracking unit 329);



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wherein said at least one of said buffers contains two or more packets (see abstract, buffers for temporary buffering the packets).

However, Muller '132 are silent to disclosing a sum over all packet in said at least one of said buffer.

Manning '736, as the same or similar fields of endeavor, disclose buffer usage count (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)) (col. 13, lines 40-45, buffer usage data); comprising:

buffer provides an indication of the sum (col. 6, lines 20-35, total number of cells) over all packets in said at least one of said buffers of the number of output ports toward which each of said packets is destined, wherein said at least one of said buffers contains two or more packets (col. 6, lines 25-35, Buffer\_counter 32 means sum of number of packets in the buffer) (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply a sum over all packet in said at least one of said buffer of Manning '736 into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132; A sum over all packet in said at least one of said buffer can be implemented into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132. The motivation for using a sum over all packet in said at least one of said buffer taught by Manning '736 into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132 which is a flow control mechanism in a distributed switching architecture (see Manning '736, col. 1, lines 10-12).

Regarding to claim 13, Muller '132 disclose the step of determining whether a buffer is free based on said buffer usage count (Abstract, a shared memory manager for a packet forwarding device includes a pointer memory having stored therein information regarding buffer usage (e.g., usage counts) for each of a number of buffers in a shared memory. An encoder is coupled to the pointer memory for generating an output which indicates a set of buffers that contains a free buffer. The shared memory manager further includes a pointer generator that is coupled to the encoder for locating a free buffer in the set of buffers. The pointer generator is further configured to produce a pointer to the free buffer based upon the output of the encoder and the free buffer's location within the set of buffers) (col. 15, lines 66-67, col. 16, lines 1-3, wherein the step of dynamically allocating one or more buffers in a shared memory by determining one or more free buffer pointers further includes the step of updating a usage count corresponding to each of the one or more free buffer pointers).

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 - Manning '736 ) in view of Nation et al. (Patent No.: US 7,301,906).

Regarding to claim 10, Muller '132 disclose said buffer usage count by one to indicate that a packet destined for one output port is stored in said buffer (Abstract, a shared memory manager for a packet forwarding device includes a pointer memory having stored therein information regarding buffer usage (e.g., usage counts) for each of a number of buffers in a shared memory. An encoder is coupled to the pointer memory for generating an output which indicates a set of buffers that contains a free buffer. The shared memory manager further includes a pointer generator that is coupled to the encoder for locating a free buffer in the set of buffers. The pointer generator is further configured to produce a pointer to the free buffer based upon the output of the encoder and the free buffer's location within the set of buffers) (col. 15, lines 66-67, col. 16, lines 1-3, wherein the step of dynamically allocating one or more buffers in a shared memory by determining one or more free buffer pointers further includes the step of updating a usage count corresponding to each of the one or more free buffer pointers, wherein the step of updating a usage count corresponding to the free buffer pointer comprises the step of setting the usage count to a predetermined value to accommodate a potential race condition in usage count processing.).

However, the combined system (Muller '132 - Manning '736 ) are silent to disclosing the step of incrementing said buffer usage count by one to indicate that a packet destined for one output port is stored in said buffer.

Nation '906 disclose the step of incrementing said buffer usage count by one to indicate that a packet destined for one output port is stored in said buffer (col. 10, lines

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10-18, If the received packet is stored in buffer memory dedicated to the specific port, element 208 may therefore represent processing to increment a counter representing usage of preallocated, dedicated storage per port. If the received packet is stored in shared buffer memory, element 208 may therefore represent processing to increment a counter representing usage of shared storage per port and also decrementing a second counter representing available shared storage. Conversely, element 212 represents processing to increment or decrement appropriate counters indicating freeing of a previously allocated buffer either allocated as dedicated memory associated with the port or allocated from shared memory for temporary use by a particular port).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate step of incrementing said buffer usage count by one to indicate that a packet destined for one output port is stored in said buffer taught by Nation '906 into the combined system (Muller '132 - Manning '736 ) in order to improve architecture in flow control and buffer memory management for high-speed serial communication devices to maintain high performance while reducing buffer memory requirements (Nation '906, col. 3, lines 46-47).

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 - Manning '736 ) in view of Davis (Pub. No.: US 2007/0208876).

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Regarding to claim 11, Muller '132 discloses the step of decrementing (col. 12, lines 5-6, decremented) said buffer usage count (abstract, usage count) by one (col. 12, field count values) when a data unit is read from said buffer (col. 12, lines 7-20, the count field will accurately reflect the current number of output ports for the buffer pointer whether or not the count field was previously decremented by one or more output ports 206 as illustrated in Table 1, below. Table 1 illustrates the count field's value after each of the actions in the first column. An input port 206 requests a buffer pointer from the buffer 0000b tracking unit 329. A buffer pointer is provided to the input port 206. 1111b The forwarding decision indicates the packet including the 1111b buffer is to be forwarded to three output ports 206. The input port notifies the buffer tracking unit 329 of 1111b number of owners of the buffer and forwards the buffer pointer to each of the three output ports 206. One output port 206 completes transmission of the buffer 1111b and notifies the buffer tracking unit 329 that it no longer holds a copy of the buffer pointer. The buffer tracking unit 329 processes the output port's 1110b notification prior to the input port's notification. Read: 1111b Modify:  $1111b - 0001b = 1110b$  Write: 1110b The buffer tracking unit 329 processes the input port's 0010b notification which indicates there are 3 buffer owners. Read: 1110b Modify:  $1110b + 0011b + 0001b = 0010b$  Write: 0010b).

However, the combined system (Muller '132 - Manning '736 ) are silent to disclosing said data unit is the last data unit of a packet.

Davis '876 discloses the step of updating said buffer usage count (the usage buffer) by one when a data unit is read from said buffer and said data unit is the last

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data unit of a packet (end of the packet) (page 8 paragraph [0093] Buffer are allocated using a free buffer list.....when a buffer is full, or an end of packet is detected, the header queues corresponding to that packet are updated, as is information in the usage buffer...when the header queue is updated, the buffer entry in the usage buffer is updated with information from an FID RAM)

Thus, one would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the step of updating said buffer usage count by one when a data unit is read from said buffer and said data unit is the last data unit of a packet taught by Davis '876 into the combined system (Muller '132 - Manning '736 ) in order to perform network monitoring without the use of additional probes (Davis '876 , page 1 [0005]).

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Muller '132 - Manning '736 ) in view of Miller et al. (Patent No.: US 6,247,058)

Regarding to claim 12, Muller '132 disclose said buffer usage count (See abstract, Usage count); however, the combined system (Muller '132 - Manning '736 ) are silent to disclosing wherein said usage count indicate a number of destination port for a packet to perform a multicasting operation.

Miller '058 disclose wherein said usage count indicate a number of output port for a packet to perform a multicasting operation (col. 7, lines 43-45, When a broadcast or multicast packet is received, it is assigned a time stamp and stored in broadcast packet

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output buffer 98 along with a counter indicating the number of ports to which the packet is broadcast).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein said usage count indicate a number of output port for a packet to perform a multicasting operation taught by Miller '058 into the combined system (Muller '132 - Manning '736 ) in order to support a variety of packet management function (Miller '058, col. 1, line 10). The combined system would have been enable to handle additional traffic (Miller '058, col. 4, line 27).

### ***Response to Arguments***

14. Applicant's arguments filed 03/09/09 have been fully considered but they are not persuasive.

#### **Claim 9:**

In the page 7, lines 28-32, the applicant argues that Muller '132 and Manning '736, alone or in combination, do not disclose "maintaining a buffer usage count for at least one of said buffers, wherein said buffer usage count provides an indication of a sum over all packets in said at least one of said buffers of a number of output ports toward which each of said packets is destined, wherein said at least one of said buffers contains two or more packets".

The examiner respectfully disagrees with the applicant's argument.

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Muller '132 disclose maintaining a buffer usage count (see abstract, buffer usage count) for at least one of said buffers (Abstract, a shared memory manager for a packet forwarding device includes a pointer memory having stored therein information regarding buffer usage (e.g., usage counts) for each of a number of buffers in a shared memory ) (col. 7, lines 25-27, The shared memory manager 220 then updates its internal counts used for tracking the number of buffer owners and returns the buffer to the free pool if appropriate (e.g., the buffer is no longer in any output queues)) (col. 9, lines 35-37, The buffer tracking unit 329 additionally includes a pointer random access memory (PRAM) 320. The PRAM 320 may be an on or off-chip pointer table that stores usage counts for buffers of the shared memory 230);

a counter for monitoring a buffer usage count (Abstract, Usage count) provides an indication of the input (write) over all packets in said at least one of said buffers of the number of output ports (two output ports) toward which each of said packet is destined (col. 12, lines 30-31, the other two output ports 206 complete transmission of the buffer and so notify the buffer tracking unit 329 Write "SUM" = 0010b) (col. 12, lines 27-30, The buffer tracking unit 329 processes the input port's 0010b notification which indicates there are 3 buffer owners. Read: 1110b Modify: 1110b + 0011b + 0001b = 0010b Write: 0010b The other two output ports 206 complete transmission of 0010b the buffer and so notify the buffer tracking unit 329).

Muller '132 disclose all the subject matter of the claimed invention with the exception of a sum over all packet in said at least one of said buffer.



Manning '736, as the same or similar fields of endeavor, disclose buffer usage count (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)) (col. 13, lines 40-45, buffer usage data); comprising: buffer provides an indication of the sum (col. 6, lines 20-35, total number of cells) over all packets in said at least one of said buffers of the number of output ports toward which each of said packets is destined, wherein said at least one of said buffers contains two or more packets (col. 6, lines 25-35, Buffer\_counter 32 means sum of number of packets in the buffer) (col. 13, lines 15-25, tracking cells received at the upstream based upon observed buffer usage (buffer usage count)).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply a sum over all packet in said at least one of said buffer of Manning '736 into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132; A sum over all packet in said at least one of said buffer can be implemented into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132. The motivation for using a sum over all packet in said at least one of said buffer taught by Manning '736 into the shared memory (includes buffer 1, buffer 2, buffer 3..etc.) of Muller '132 which is a flow control mechanism in a distributed switching architecture (see Manning '736, col. 1, lines 10-12).

For the reasons above, the examiner believes the rejection of claim 9 under 35 U.S.C 103 based on Muller '132 and Manning '736 references should be sustained.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHUONG T. HO whose telephone number is (571)272-3133. The examiner can normally be reached on 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, EDAN ORGAD can be reached on (571) 272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Ch  
03/12/09

/Edan Orgad/  
Supervisory Patent Examiner, Art Unit 2419